National Institute of Environmental Health Sciences

Potential impacts of climate change on the ecology of dengue and its mosquito vector the Asian tiger mosquito (Aedes albopictus)

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Abstract:

Shifts in temperature and precipitation patterns caused by global climate change may have profound impacts on the ecology of certain infectious diseases. We examine the potential impacts of climate change on the transmission and maintenance dynamics of dengue, a resurging mosquito-vectored infectious disease. In particular, we project changes in dengue season length for three cities: Atlanta, GA; Chicago, IL and Lubbock, TX. These cities are located on the edges of the range of the Asian tiger mosquito within the United States of America and were chosen as test cases. We use a disease model that explicitly incorporates mosquito population dynamics and high-resolution climate projections. Based on projected changes under the Special Report on Emissions Scenarios (SRES) A1fi (higher) and B1 (lower) emission scenarios as simulated by four global climate models, we found that the projected warming shortened mosquito lifespan, which in turn decreased the potential dengue season. These results illustrate the difficulty in predicting how climate change may alter complex systems.

Source: http://dx.doi.org/10.1088/1748-9326/7/3/034003

Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES), Other Climate Scenario

Special Report on Emissions Scenarios (SRES) Scenario: SRES A1, SRES B1

Other Climate Scenario: NCAR/CCSM3,; UKMO/HadCM3; NOAA/GFDL CM2.1 ; DOE/NCAR PCM

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified, Urban

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Dengue

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Medium-Term (10-50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content